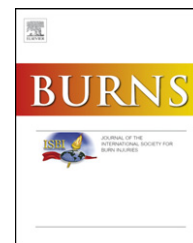


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# The severity of kettle burns and the dangers of the dangling cord

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## ABSTRACT

Kettle scalds are a major cause of paediatric burn injury. Whilst preventative measures have been advocated for years, the incidence of this type of injury is increasing. Information is lacking regarding severity and mechanism of injury.

We prospectively analysed all paediatric scald injuries that warranted referral to a tertiary burn centre to quantify severity, outcome, look into how these burns occurred with a view to providing information for preventative strategies and audited the safety features of 19 top selling kettles.

A total of 119 kettle burns were included in the study. Mean age at time of injury was 2 years 1 month (5 months to 12 years). Mean TBSA was 11.8% (2–30) and 62% sustained TBSA >10%. Mean length of stay was 10.4 (1–120) days and a surgical procedure was required in 62% of all kettle scalds. Grafting was undertaken in 52% of patients. Mean number of surgical procedures was 1.7 (median 1, range 1–9). Pulling the kettle cord was the main mechanism of injury (74% vs. 37%). “Cord-pullers” were also significantly younger (mean 20 months vs. 51 months,  $p < 0.05$ ) and underwent significantly more grafting in “cosmetically sensitive” areas (69% vs. 23%,  $p < 0.05$ ). 4 cases of inhalational injury occurred as a result of pulling the kettle cord. Mean kettle cord length was 66 cm (range 45–80) with only 30% employing a coil tidy feature.

In view of these findings we discuss current legislative policy on kettle cord length and report on the current safety of today's kettles. Areas for future prevention are discussed.

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## 1. Introduction

Scalds are the commonest mechanism of childhood burns worldwide and affect toddlers disproportionately because of their mobility and curiosity in their home environment [1–6]. One common cause of childhood scald is from kettles [7–12]. 32% of paediatric burn admissions in Africa are due scalding injuries caused by hot liquids [16]. Scalds are common in South Africa with a mean annual rate of 6.0/10,000 child-years (c-y) [17]. These scalds are often more extensive and deeper than

other forms of scald. However, the reason for these accidents is often not specifically stated, although some studies have pointed to design flaws in the kettle [13–15]. Common predisposing factors are lack of enabling environment, poor socio-economic circumstances, insufficient education, overcrowding and deficiency in safe energy sources. Most of these injuries are preventable and previous studies of African burns have highlighted the need for better preventative strategies [16,18,19].

We prospectively analysed all kettle burns warranting admission to a tertiary paediatric burn unit, to establish

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mechanism of injury, quantify severity, outcome, and to develop preventative strategies.

## 2. Methodology

A prospective analysis was done over a 16-month period for all kettle burn injuries that were admitted to The Red Cross War Memorial Children's Hospital, South Africa.

Age, gender, site of burn, total body surface area (TBSA%), and depth of burn were collected prospectively via a proforma. TBSA was calculated using Lund and Browder charts standardised for age. The senior author assessed depth of burn within 24 h of admission. Mechanism of burn, circumstances leading to burn, location of burn, household monthly income, number of parents in household and number of children in the household were collected prospectively using a parent questionnaire and interview. Outcome measures including number and type of operations, intensive care admissions, length of stay, length of follow-up and complications were gathered retrospectively via case notes.

Inclusion criteria were as follows: scald injuries from kettles in a child less than 12-years of age that warranted admission to a tertiary referral burn centre. Children with polytrauma, non-accidental injury, and burns not requiring immediate hospital admission or referral were excluded.

Lastly, we prospectively measured the kettle cord length and the presence/absence of a coil tidy in 19 of the top selling kettles in the three largest department stores in South Africa.

Local ethics approval was obtained prior to commencing the study.

## 3. Results

A total of 119 kettle scald injuries were seen over the 16-month study period of which 62% (42/119) were male and 38% (45/119)

female. The mean age was 25 months (median 17 months, range 5 months to 12 years).

The age distribution is depicted in Fig. 1. 59% (71/119) children were under the age of two years.

The mean total body surface area (TBSA) was 11.3% (median 12, range 2–30%) (see Fig. 2). In total, 62.4% of children sustained scalds over >10% TBSA. 45 kettle burns were deemed partial thickness at time of presentation, 74 were deemed deep-dermal eventually requiring surgical intervention. Face, chest and arms were most commonly affected (Fig. 3).

The mechanisms of the injury was a child pulling the dangling kettle cord ("cord pullers") in 72% (86/119), the kettle falling onto the child in 16% (17/119), a direct kettle spill from the spout in 7% (10/119) and other reasons including kicking the kettle and falling on-top of the kettle placed on the floor in 5% (6/119). The number of children sustaining scalds from pulling the kettle cord was significantly higher than the number of children sustaining scalds from other mechanisms ( $74\% \pm 8$  vs.  $26\% \pm 8$ ,  $p < 0.05$ ) (Z-test for proportions). 96% (114/119) of these injuries occurred in the kitchen. Of the remaining five, two scalds occurred in the bedroom, two in the dining room, and one in the bathroom.

Of the 104 parents who were able to provide information on income, the median monthly household income was 380ZAR (South Africa Rand) (range 0–6000) – equivalent to \$142 USD range 0–\$840 USD. 42% (44/104) had no income and relied on state benefit and only 20% (21/104) of parents had a salaried income. 70% (83/119) of kettle scalds occurred in single parents homes. 30% (36/119) of kettle scalds occurred when there were two or more adults living in the house. Mean number of children in the house was 2.6 (median 2, range 1–8).

Mean length of stay for all kettle burns was 10.4 days (median 7, range 1–120 days). 4% (5/119) of kettle scalds warranted intensive care (ICU) admission. Four were due to inhalational injury as diagnosed with laryngoscopy. Inhalational injury was confirmed upon visualisation of the

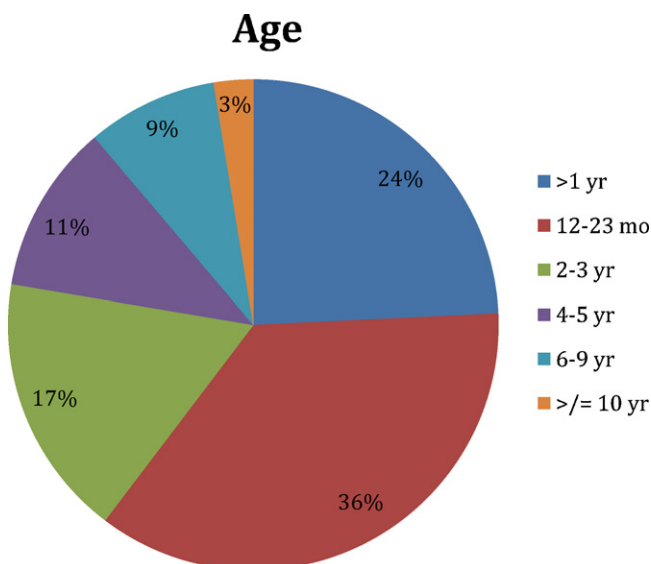


Fig. 1 – Age distribution of all kettle burns in %. Total,  $n = 119$ .

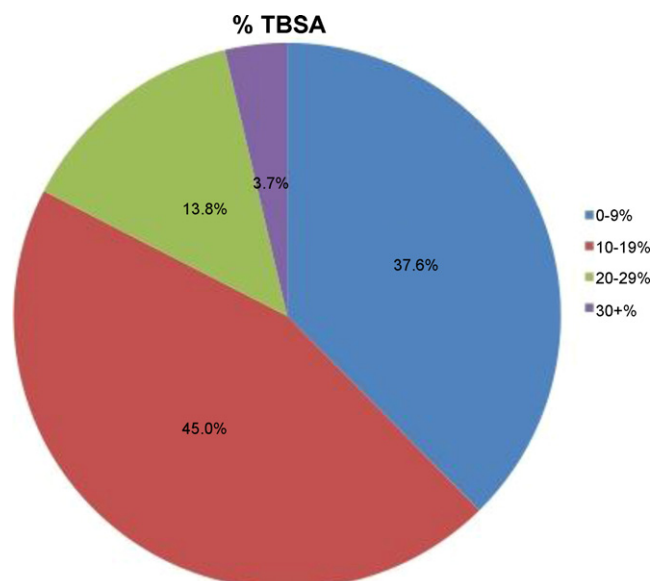


Fig. 2 – Total body surface area (TBSA) for all kettle scalds,  $n = 19$ .

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